HYGROMATIK

Manual

Electrode Steam Humidifier

MiniSteam

A Word about Water Quality

The mode of operation of all electrode steam humidifiers is based on the fact that water contains minerals and is therefore conductive.

- "normal" tap water is ideal.
- but what is "normal" tap water exactly?

Users of HygroMatik units in the most diverse areas consider their tap water "normal."

HygroMatik typically defines "normal" as feed water with a conductivity between 200 and 500 µS/cm (microSiemens per centimeter) at 15° C.

Some areas, however, are supplied with tap water whose quality is outside the parameters specified by HygroMatik. If the HygroMatik steam humidifier's control is not adjusted correctly in these areas, the unit cannot perform optimally. For example, the electrodes could wear out particularly quickly or the steam production could be too low.

The operational parameters set by HygroMatik in the factory are intended for normal tap water. However, they can very easily be reprogrammed to fit the special requirements of a particular area. In addition, it is possible to install a plastic star in the cylinder in order to increase the life span of the electrodes or to provide a flushing mechanism to extend maintenance intervals.

Because of this you should monitor your new unit during initial operation. Make sure that it has been properly installed and is operating to your satisfaction.

Consult your HygroMatik specialists. We will test the quality of your water and advise you on installation and initial operation. Your HygroMatik steam humidifier will be carefully adapted to your particular application.

© Copyright HygroMatik Lufttechnischer Apparatebau GmbH

MiniSteam 0501

Information in this manual is subject to change or alteration without prior notice.

Warning, Hazardous Voltage: All work to be performed by trained personnel only. All electrical installation and servicing of the electrical components of this unit to be performed by qualified electricians only. Disconnect power supply before installation and servicing!

1. Introduction 5
1.1 Directions for Use 5
1.2 Typographic Distinctions 6
1.3 Documentation 6
2. Safety Notes 7
2.1 Overview 7
2.2 Guidelines for Safe Operation 7
2.3 Disposal after Dismantling 8
3. Transport 9
3.1 Overview 9
3.2 Carton outer Size and Weight 9
3.3 Packing 10
3.4 Interim Storage 10
3.5 Check for Complete and Correct Delivery of Goods 10
3.6 Included in the Delivery 10
4. Operation and Installation 11
4.1 Mode of Operation 11
4.2 Installation and Operation 11
5. Installation 14
5.1 Steam Humidifier Operating Environment 14
5.1.1 Fitting measures 15
5.2 Unit Installation Check 16
5.3 Unit Dimensions 17
6. Water Installation 18
6.1 Operation with Softened Water 18
6.2 Water Supply 19
6.3 Water discharge 20
6.4 Water Installation Check 21
6.5 Filling Cup (Option) 22
7. Electrical Connection 24
7.1 Electrical Installation 24
7.2 Safety Interlock 27
7.3 Wiring Diagram 27
7.4 Electrical Installation Checklist 27
8. Commissioning 28
9. Maintenance 29
9.1 Maintenance Work 29
9.2 Access Electrical Enclosure 30
9.3 Removing and Cleaning the Steam Cylinder 31
9.4 Electrode wear 34
9.4.1 Original Electrode Lengths 34

9.4.2 Uneven Electrode Lengths 35
9.5 Replacing Electrodes 35
9.6 Cleaning the Blow- Down Pump 37
9.7 Cleaning the Water Inlet Solenoid Valve 37
9.8 Checking Cable Connections and Electrode Cables 38
9.9 Checking Operation 38
9.10 Dismantling 38
10. EC-Decleration of Conformity 39
11. Spare Parts 40
12. Fax Form - Order for spare parts 42
13. Technical Data 43
14. Exploded View 44
15. View of housing 45

1. Introduction

Dear Customer,

Thank you for choosing a HygroMatik steam humidifier.

HygroMatik steam humidifiers represent the latest in humidification technology.

They will impress you with their safety, ease of use and economical operation.

In order to operate your HygroMatik steam humidifier safely, properly and efficiently, please read these operating instructions.

Employ your steam humidifier only in sound condition and as directed. Consider potential hazards and safety issues and follow all the recommendations in these instructions.

If you have additional questions, please contact us:

Tel.: **+49-(0)4193 / 895-0** **(Main Number)**

Tel.: **+49-(0)4193 / 895-293** **(Technical Support Hotline)**

Fax: **+49-(0)4193 / 895-33**

e-mail: **hot1@HygroMatik.de**

For all technical questions or spare parts orders, please be prepared to provide unit type and serial number (see name plate on the unit).

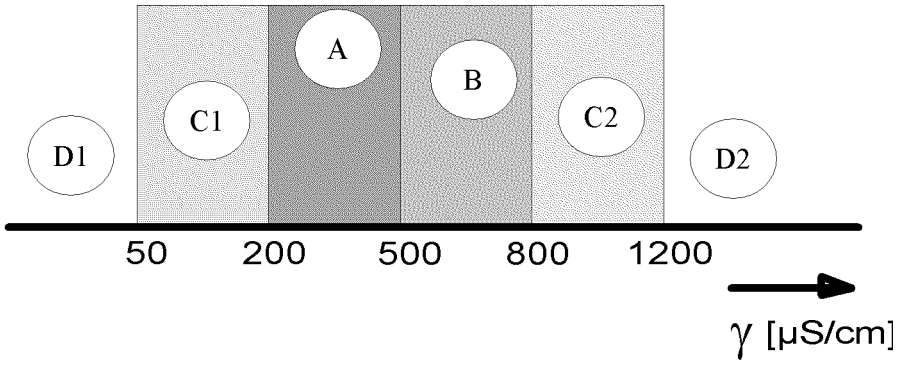
1.1 Directions for Use

The HygroMatik steam humidifier is intended for steam production.

Proper usage also entails following HygroMatik's instruc-tions for installation, dismantling, reassembly, initial operation and operation and maintenance, as well as disposal procedures.

Only qualified, authorized personnel may operate or service the unit. Workers who transport or service the unit must have read and understood the relevant sections of the operating instructions, especially the section "Safety Notes." In addition, staff must receive safety training about potential hazards from the operator. Place a copy of the operating instructions at the location where the unit is operated.

Use feed water with a conductivity between 50 and 1200 µS/cm only



D1: Lower threshold

C1: Range of reduced conductivity

A: Normal tap water

B: Range of heightened conductivity

C2: Range of heigh conductivity

D2: Upper threshold

Warning: HygroMatik steam humidifiers emit steam with a temperature of 100° C. The steam may not be inhaled directly.

The HygroMatik Steam Humidifier is not designed for outdoor fitting.

1.2 Typographic Distinctions

- preceded by a bullet: general specifications.

» preceded by an arrow: Procedures for servicing or maintenance which should or must be performed in the indicated order.

☑ Installation step which must be checked off.

italics Terms used with graphics or drawings.

1.3 Documentation

Retention

Please retain these operating instructions in a secure, always accessible location. If the product is resold, turn the documentation over to the new operator. If the documentation is lost, please contact HygroMatik.

Versions in Other Languages

These operating instructions are available in several languages. If interested, please contact HygroMatik or your HygroMatik dealer.

2. Safety Notes

2.1 Overview

These safety notes are required by law. They promote workplace safety and accident prevention.

Warnings and Safety Symbols

The safety symbols below identify sections containing warnings about hazards or potential dangers. Please familiarize yourself with these symbols.

Warning: Failure to observe this warning may result in serious injury or death and/or damage to the unit.

Danger, Hazardous Voltage: Hazardous electrical current! Failure to observe this warning may result in injury or even serious injury or death.

Warning: Failure to follow these instructions may result in damage to the unit due to electrostatic discharge. The electronic components of the humidifier control are very sensitive to electrostatic discharges. In order to safeguard these components during installation and servicing, steps must be taken to protect against ESD.

Reminder: Materials and consumables must be handled and/or disposed of as required by law.

Note: Appears before explanations or cross-references which refer to other sections of the operating instructions.

2.2 Guidelines for Safe Operation

Overview

Obey all safety notes and warnings present on the unit.

In case of a malfunction, switch off the unit immediately and prevent a restart. Repair malfunctions promptly.

After any repair work, have qualified personnel check the safe operation of the unit.

Use original spare parts only.
Additional national safety regulations also fully apply to the operation of this unit.

Accident Prevention Regulations

Comply with the accident prevention regulation
Accident Prevention Regulation Electrical Systems and Equipment (VBG4/BGVA2) to prevent injury to yourself and others.

Operation of the Unit

Do not perform any work which compromises the safety of the unit.

Regularly check that all safety and monitoring devices are functioning normally.

Do not remove or disable safety devices.

Installation, Dismantling, Maintenance and Repair of the Unit

Disconnect unit components from power supply prior to maintenance or repair work.

Attaching or installing **additional components** is permitted only with the **written consent** of the manufacturer.

Electrical

Work on the electrical system must be performed by qualified personnel.

Disconnect unit components from power supply prior to work

In case of a malfunction in the electrical power supply, switch off the unit immediately.

Use only original fuses with the appropriate amperage rating.

Regularly check the unit's electrical equipment. Promptly repair any damage, such as loose connections or burned wiring. After proper electrical installation or repair, test all safety mechanisms (such as grounding resistance).

HygroMatik steam humidifiers are IP20-protected. Make sure that the unit is protected from drips in its installed location.

Installing a humidifier in a room without water discharge requires safety devices to protect against water leakages.

2.3 Disposal after Dismantling

Note: The operator is responsible for the disposal of unit components as required by law.

3. Transport

3.1 Overview

Note: Proceed carefully when transporting the steam humidifier in order to prevent damage due to stress or careless loading and unloading.

3.2 Carton outer Size and Weight

HyLine:

Type*	Height [cm]	Width [cm]	Depth [cm]	Weight [kg]
HY05- 08	58	56	32	16
HY13- 17	75	63	37	24
HY23	75	63	37	25
HY30	81	67	41	33
HY45	88	76	48	46
HY60	80	104	41	54
HY90- 116	90	117	48	77

CompactLine:

Type*	Height [cm]	Width [cm]	Depth [cm]	Weight [kg]
C6	52	50	28	13
C10	58	51	31	14
C17	75	54	37	22
C30	75	58	37	23
C45	81	63	41	25
C58	90	72	48	36

MiniSteam:

Type**	Height [cm]	Width [cm]	Depth [cm]	Weight[kg]
MS 5	59	48	28	13
MS 10	68	51	31	15

* Dimensions and weights may vary slightly.

3.3 Packing

Note: Notice the symbols affixed to the packing box.

3.4 Interim Storage

Store the unit in a dry place and protect from frost.

3.5 Check for Complete and Correct Delivery of Goods

Upon receipt of the unit, confirm that:

- the type and serial number on the name plate match those specified in the order and delivery documents and
- the equipment is complete and all parts are in perfect condition

Note: In case of damage during shipment or missing parts, immediately notify the carrier or supplier in writing.

Time limits for filing freight claims with shipping companies are*:

Shipping Companies	After Receipt of Goods
Mail	no later than 24 hours
Rail	no later than 7 days
Truck and Rail Carriers	no later than 4 days
Parcel Service	immediately

* Time limits for some services subject to change.

3.6 Included in the Delivery

The delivery includes:

- Unit of the selected HyLine type including selected control.
- Water installation hose 0,6m, 3/4".
- Mounting set with anchors and screws. For HyLine types HY45 to HY116, extra mounting bar.
- Operating Instructions for the unit and the control.
- Ordered accessories (steam manifold, steam hose, condensate hose, etc.).
- Maintenance o-ring set for steam cylinder.

4. Operation and Installation

4.1 Mode of Operation

The HygroMatik steam humidifier utilizes the conductivity normally present in tap water for steam production. Electrodes inside an enclosed steam cylinder are immersed directly into the tap water. They are connected to the alternating current.

The conductivity of the water generates an electric current between the electrodes. In this way, the electric power supplied is converted directly into heat without energy loss.

The amperage is a function of the available voltage, the immersed electrode surface area, the average distance between the electrodes and the water conductivity. The steam output of the humidifier is determined by electric power usage, which is regulated by increasing or decreasing the immersed surface area of the electrodes.

Concurrently, a self-regulating control keeps conductivity within a specified range.

The steam produced has a temperature of about 100°C with minimal excess pressure ("pressureless steam"). It is free of minerals and largely germ-free. Mineral deposits typically remain behind in the cylinder.

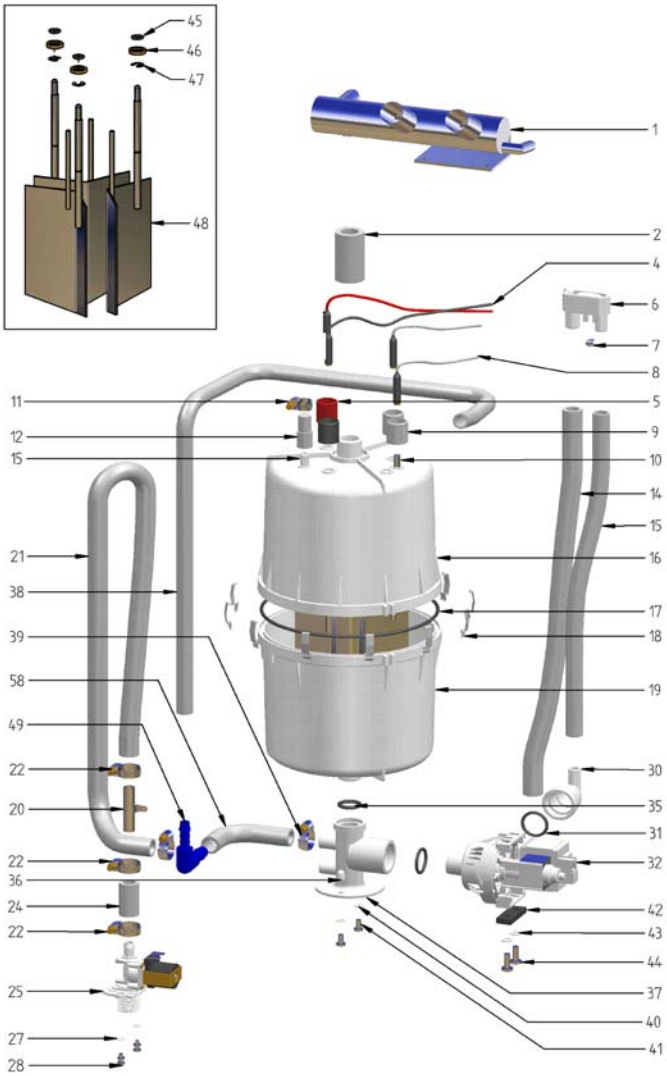
4.2 Installation and Operation

When the controller specifies an increase in humidity, the main contactor is switched on and the electrodes (48) are supplied with power. The water inlet solenoid valve (25) feeds water into the steam cylinder (16+19).

As soon as the electrodes are immersed, the current begins to flow. The water is now heated. When the pre-selected output is reached, the control turns off the solenoid valve and interrupts the water supply.

After a short heating up period, the water between the electrodes begins to boil and vaporize. The vaporization lowers the water level (W) in the steam cylinder, reducing the output provided. The inlet solenoid valve, equipped with a fine mesh filter, intermittently admits fresh water.

Humidifier power usage is continuously monitored. With a cold start-up, the nominal current increases to 125% in order to achieve quick-start output parameters. This activates the electronic overflow limiter which causes a partial draining of the cylinder. This reduces the immersed surface area of the electrodes, lowering power usage.



Please also see Section „Exploded View“.

Location	Designation
1	steam nozzle
6	vent pipe
10	max. water level sensor electrode
14	water drain, discharge
16	top part of steam cylinder
17	o-ring cylinder flange
18	cylinder flange and o-ring
19	lower part of cylinder
25	solenoid valve water inlet
32	blow-down pump
35	o-ring
37	cylinder base
48	electrodes

The concentration of dissolved salts increases over time, which can lead to a rise in the conductivity of the water. If this continues, conductivity may increase until a short circuit occurs. This could damage the unit, but in any case would significantly reduce the life span of the electrodes.

For this reason, regular, periodic blow-downs of some of the concentrated water are very important. Following this procedure as recommended provides stable cylinder water conductivity as well as minimal water loss for the expected service life of the cylinder.

Water blow-down is performed by a blow-down pump (32). The functioning of the blow-down pump is continuously monitored during operation. If the pump is damaged, the steam humidifier shuts down.

With normal water quality, the blow-down loss rate is between 7% and 15% of the amount of steam produced. The steam cylinder requires complete drainage every 3-8 days, regardless of the water quality.

Mineral deposits (H) settle in the open area below the electrodes and are removed through periodic maintenance. The blow-down pump itself has wide openings and can flush out smaller pieces of mineral deposit. This extends the service life of the unit and reduces the required maintenance interval.

During blow-downs, water flows from the pump into the drainage system.

A sensor electrode (10) monitors the maximum water capacity of the cylinder. When the water level reaches the sensor electrode, the water supply is interrupted. This can occur when the water has low conductivity or when the electrodes are worn out. In the case of low water conductivity, however, this state usually lasts only a short time. The built-in control and the large area electrodes combine to produce a rapid rise in conductivity by increasing the concentration of the water.

The steam cylinder consists of a top (16) and lower (19) part joined with a cylinder flange. The seal between the cylinder and cylinder base (37), as well as between the top and lower part of the cylinder, is maintained using an o-ring (35).

5. Installation

Warning: Installation of this unit to be attempted only by qualified personnel. We accept no liability for damage due to faulty installation.

Obey all safety notes and warnings present on the unit.

During installation the unit must be disconnected from its power supply.

Attaching or installing additional components is permitted only with the written consent of the manufacturer, or else the warranty is void.

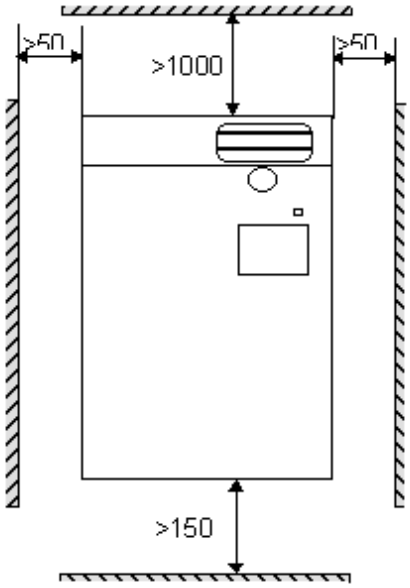
5.1 Steam Humidifier Operating Environment

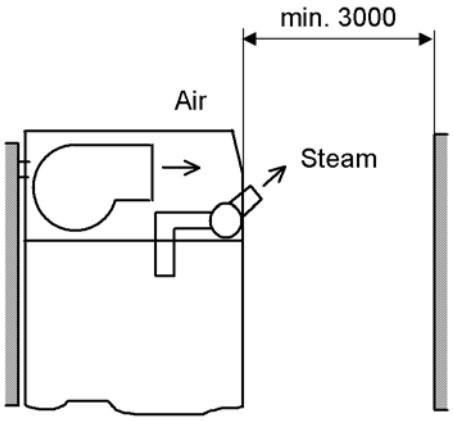
Note: When selecting the installation site for the steam humidifier, note that:

- Ambient temperature must be between 5° and 40° C.
- Relative humidity must not exceed 80% RH.
- The minimum clearances indicated in the diagram below must be observed; these are necessary to ensure adequate ventilation for the housing.
- The rear panel of the steam humidifier heats up during operation (to a maximum of 60°C). Take care that the construction on which the unit is mounted is not made of temperature-sensitive material.
- Place the steam humidifier so that the unit is easily accessible with sufficient space to perform maintenance.
- The steam humidifier is not qualified for exterior applications.

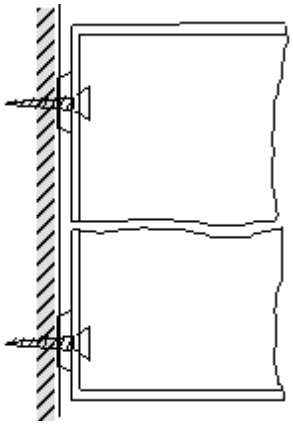
5.1.1 Fitting measures

Wall Distances [mm]





Wall Mounting



Note: The steam humidifier must be installed vertically in order to function properly.

Note: The steam humidifier should be positioned such that draught effects are avoided. A minimum height of 2 m above floor level is generally sufficient.

» Position the steam humidifier in the planned location, adjust with spirit level and mark position of hanging bolts. See "Equipment Dimensions".

» Hang the unit onto bolts screwed into the marked position.

5.2 Unit Installation Check

Attention: This unit may only be operated by qualified and properly trained personnel.

Please check the installation using the following list:

☑ Does unit hang vertically?

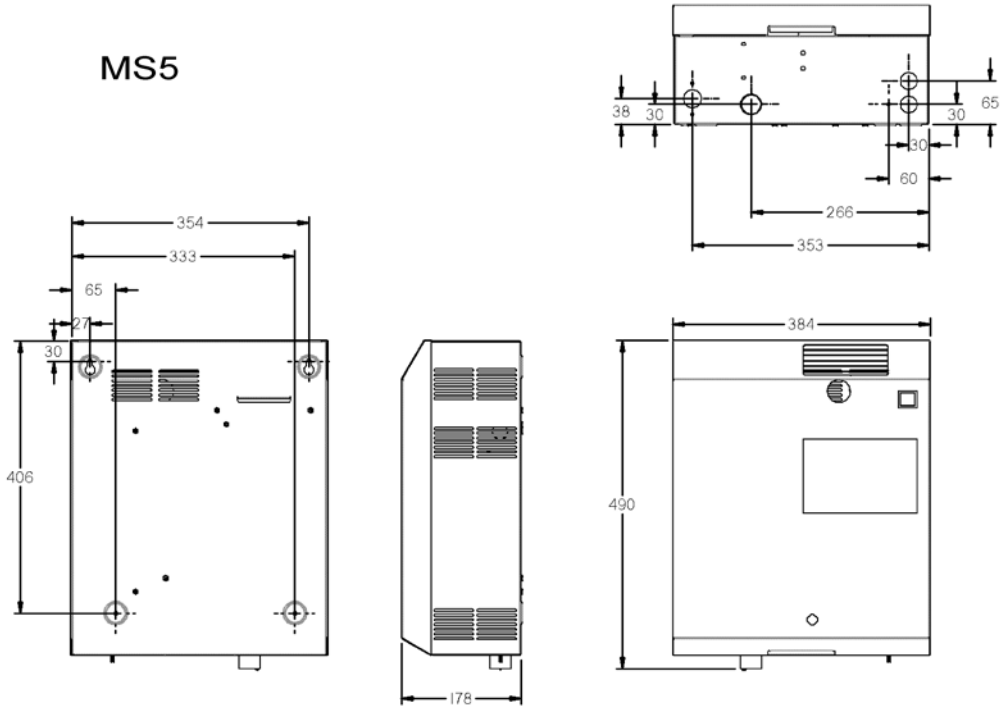
☑ Are wall distances to the unit within the range

☑ Is the unit installed in such a way that draught effects are avoided?

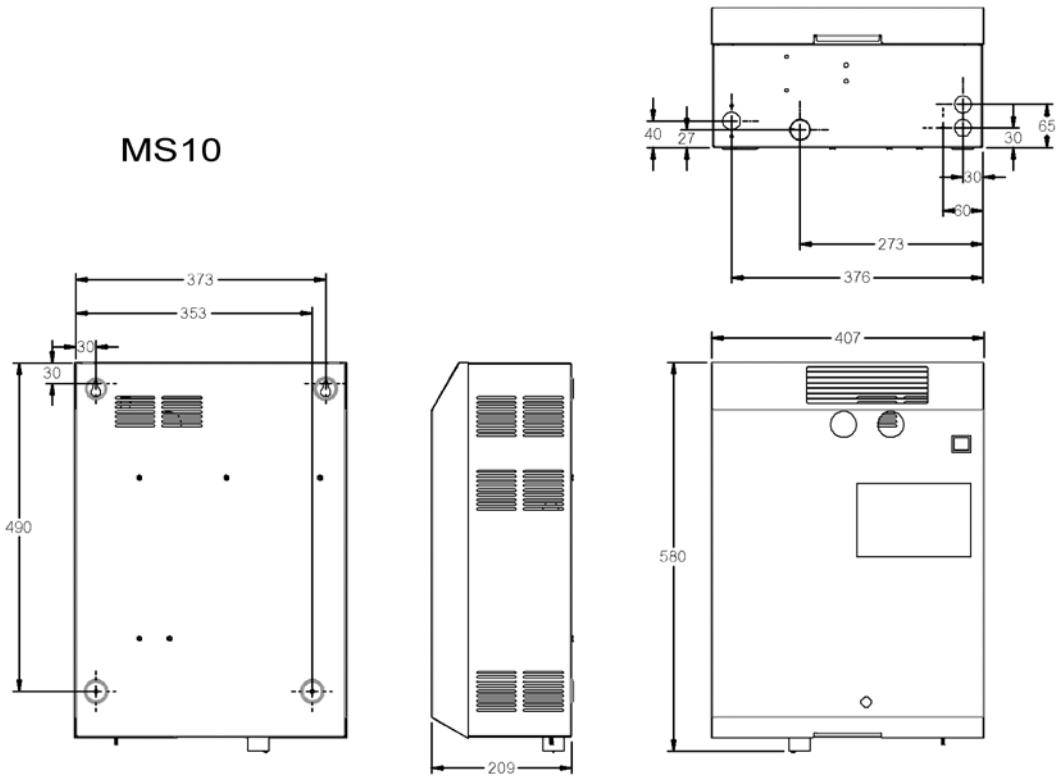
☑ Are all bolts and clamps tightened?

5.3 Unit Dimensions

MS5



MS10



6. Water Installation

Warning: When installing the water installation, note the following:

- Have all work performed by a professional.
- Disconnect power supply before installation.
- Obey local public utility regulations
- Verify that necessary safety measures have been taken – in compliance with either German Technical and Scientific Association for Gas and Water (DVGW) guidelines (German Institute for Standardization [DIN] 1988) or local regulations – to eliminate backflow of polluted water into drinking water treatment facilities. This can mean laying the water supply line 300 mm above the unit (with automatic ventilator and extra check valve). Install a backflow preventer if necessary.
- Use feed water without chemical additives and with a conductivity between 200 and 800 µS/cm only. Above conductivity levels of 800µS/cm to a maximum of 1200µS/cm and below conductivity levels of 200µS/cm to a minimum of 50µS/cm, special adjustments are required. In this case please contact HygroMatik.
- The water supply temperature may not exceed 60° C.
- Water installation pressure: 100 x 10^3 to 100 x 10^4 pascal
- Blow-down water must be able to drain.

6.1 Operation with Softened Water

Warning: Unless special measures are taken, feeding softened water into the HygroMatik steam humidifier is dangerous. It can cause

- unacceptably high conductivity
- the formation of salt bridges between the electrodes and the electrode leads on the inner surface of the top part of the steam cylinder
- foaming in the steam cylinder

Salt bridges cause electrical arcs. These are indicated by the presence of black grooves in the top part of the cylinder. The top part must be replaced to prevent further damage to the cylinder material, as well as short circuits which trip main circuit breakers.

Foam comes into contact with the maximum water level sensor electrode and triggers a signal indicating the cylinder is filled to capacity, even though this is false and the nominal current has not yet been reached.

Note: Please contact HygroMatik if you wish to operate the unit with softened water.

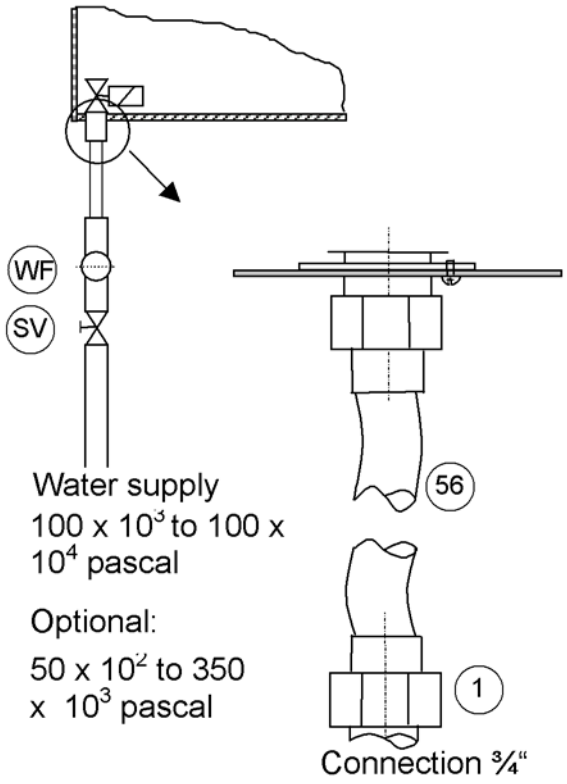
- If using a water softening system, we recommend diluting the softened water with normal tap water to produce an overall hardness between 4-8°dH.
- When feed water contains softened water, the level of conductivity is typically higher at operating temperature. Install a HygroMatik "cylinder star" to extend the service life of the electrodes.

6.2 Water Supply

» Install a shut-off valve (SV) in the supply line.

» Install a water filter (WF) if water quality requires it.

Note: Shut-off valve (SV) and water filter (WF) are not supplied with the unit



» HygroMatik provides a water hose (56) with a cap nut at both ends which can be used for water installation.

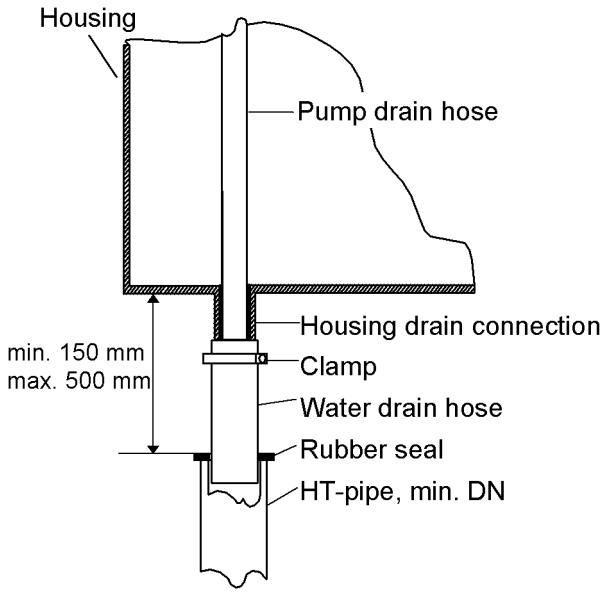
Install as follows:

» Screw and tighten the cap nut with its inner seal ring around the water supply screw connection that protrudes from the base.

Note: Tightening too much will destroy the fitting. The valve strainer (29) must be placed inside the solenoid valve.

» Use a cap nut (internal thread ¾“) with inner seal for a customer-provided water installation.

6.3 Water discharge



Warning: Water must drain freely! For water discharge, we recommend installation of a flexible water drain hose.

Please note:

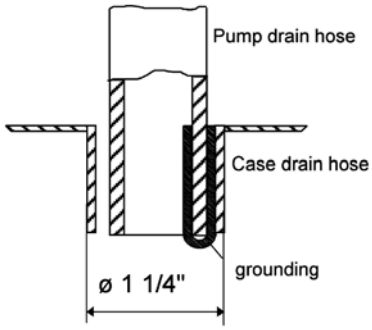
- Do not bend, shorten or lengthen the drain hose.
- Install discharge line and drain pipe made from temperature resistant material (to 95° C).

Install water discharge as follows

- Loosely insert a length of 1 1/4 " drain hose, approx. 150 - 300 mm, into a drain pipe with a minimum inner diameter of 40 mm and seal with a rubber gasket.
- Fit water drain hose over the pump drain hose and fasten to the housing drain connection.

A grounding clip is fixed on the inner surface of the housing drain connection. The end of the pump drain hose is pushed into this clip. During blow-down, the grounding clip is in direct contact with the water and shunts potential residual electric currents away from the housing.

There is a 3mm-wide crack between the pump drain hose jacket and the inner surface of the housing drain connection. If water collects in the base plate, it will flow through this crack into the drainage system.



6.4 Water Installation Check

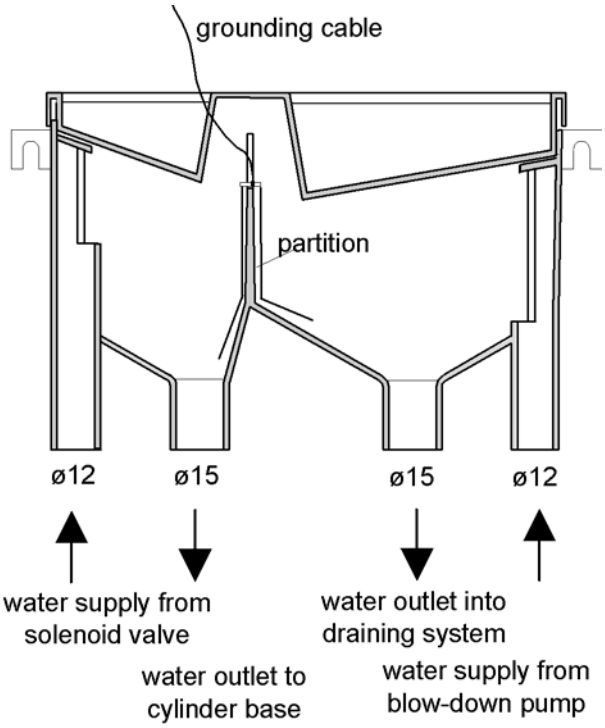
Go down the following water installation checklist:

- ☑ Are all screws and clamps properly tightened?
- ☑ Is the water supply pipe flushed?
- ☑ Was the water installation correctly installed?(See Section 6.2)
- ☑ Can the blow-down water drain freely?
- ☑ Was the water discharge correctly installed?
- ☑ Is there no leakage from the water supply pipe and water discharge?

Warning: Flush the water supply pipe before connecting to the solenoid valve, especially a newly installed pipe. This prevents premature damage.

6.5 Filling Cup (Option)

A filling cup made of recycable plastic is installed in the MiniSteam.



The functions of the filling cup are:

- Supply of water into the cylinder
- Free drain of discharged water
- Grounding of residual currents.
- Positive air gap between feed water supply line and cylinder intake, according to DIN-DVGW 689
- Overflow if cylinder intake connection is blocked

Supply of Water into the Cylinder

Filling is done in the left hand side of the cylinder.

When the solenoid valve opens, water flows through the filling cup into the cylinder. The cylinder is filled by the static pressure of the water.

If the water level in the filling cup gets too high, the water flows over the partition into the draining side.

Free Drain of Discharged Water

Draining takes place in the right hand part of the filling cup.

Upon blow-down, water flows from the pump through the filling cup and into the drain.

If the draining system is blocked, the surplus water will flow over the partition and back into the cylinder.

Grounding of Residual Currents

In the filling cup there is a grounding strip connected to the cabinet by a cable. Any residual currents are grounded during blow-down or filling.

7. Electrical Connection

Danger, Hazardous Voltage: All work related to electrical installation to be performed by authorized personnel only (electricians or professionals with equivalent training). The customer is responsible for checking qualifications.

Danger, Hazardous Voltage: Do not plug the steam humidifier into the power grid until after all installation work has been completed.

Please obey all local regulations concerning electrical installation.

Warning: The electronic components of the humidifier con trol are very sensitive to electrostatic discharges. In order to protect these components during any type of installation, steps must be taken to guard against damage from electrostatic discharge (ESD protection).

Warning: For electrical installation, note the following:

- Disconnect power supply before installation and protect against restart.
- Verify the absence of electric current.
- Make sure the unit is switched off before installing or removing the display plate or basic PCB.
- Professionally lay electrical connector cable.
- Install the electrical connections according to the wiring diagram.
- For units with rated power over 33 kW, only a permanent connection to a permanent wire is allowable (German Association for Electrical, Electronic & Information Technologies [VDE] Standard 0700 Section 98).
- Verify that all terminals have been tightened.

7.1 Electrical Installation

» Fuses must have a contact gap of at least 3mm per pole.

» Install a separate main connection for each steam cylinder, complete with main contactor, main switch, etc.

» Connect potential equalization to the outer ground bolt.

» Observe the German Association for Electrical, Electronic & Information Technologies [VDE] Standard 0100 when selecting a connection cross section.

» Install main power supplies as follows:

HyLine:

Type	Main Power Supply
HY05 - HY45	1 x 400V/3Phase/N
HY60 - HY116	2 x 400V/3Phase/N

CompactLine:

Type	Main Power Supply
CompactLine	1 x 400V/3Phase/N

MiniSteam:

Type	Main Power Supply
MS5 MS10	1 x 400V/3Phase/N
MS5	1 x 230/1Phase/N

DBE:

Type	Main Power Supply
DBE 2	1 x 230V/1Phase
DBE 6-45	1 x 400V/3Phase/N

Other voltages are available on request.

We recommend employing quick or medium blow main fuses (applicable only to the grid voltages above). See table below indicating maximum power usage for each circuit protection:

HyLine:

Type	Power Usage	Circuit Protection
HY05	5,4 A	3 x 6A
HY08	8,7 A	3 x 10A
HY13	14,1 A	3 x 16 A
HY17	18,4 A	3 x 20 A
HY23	24,9 A	3 x 35 A
HY30	32,5 A	3 x 35 A
HY45	48,8 A	3 x 63 A
HY60	2 x 32,5 A	6 x 35 A
HY90	2 x 48,8 A	6 x 63 A
HY116	2 x 62,8 A	6 x 63 A

CompactLine:

Type	Power Usage	Circuit Protection
C6	6,5 A	3 x 10 A
C10	10,8 A	3 x 16 A
C17	18,4 A	3 x 20 A
C30	32,5 A	3 x 35 A
C45	48,8 A	3 x 63 A
C58	62,8 A	3 x 63 A

MiniSteam:

Type	Power Usage	Circuit Protection
MS5, 230V/1/N	15,7 A	1 x 16 A
MS5, 400V/3/N	5,4 A	3 x 6 A
MS10, 400V/3/N	10,8 A	3 x 16 A

DBE:

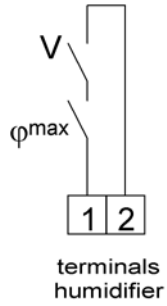
Type	Power Usage	Circuit Protection
DBE 2	6,5 A	1 x 10 A
DBE 6	6,5 A	3 x 10 A
DBE 10	10,8 A	3 x 16 A

7.2 Safety Interlock

Note: Install contact interlocks, i.e. max. hygrostat, vane relay, pressure controller, air interlock, in series between terminals 1 and 2.

Warning: A max-hygrostat should be installed in the safety interlock. The max-hygrostat acts as a safety device in case the humidity sensor malfunctions.

Warning: Contacts laid between terminals 1 and 2 must be potential free and rated for 230V switches.



7.3 Wiring Diagram

Please remove the wiring diagram from the technical manual supplied with the control used with your humidifier. Every steam humidifier comes with one technical manual for the unit and one for the control.

7.4 Electrical Installation Checklist

Perform electrical installation checks in compliance with customer site requirements and public power utility regulations:

- ☑ Is the power grid voltage compatible with the voltage on the name plate?
- ☑ Have all electrical connections been made according to the terminal connection diagram?
- ☑ Have all electrical cable and plug connections been properly tightened?
- ☑ Are all electrical socket connections secure?
- ☑ Is the unit grounded?

After this check the unit can be switched on.

Warning: The unit must be closed and locked. This guarantees that the cover is grounded.(only humidifier type HyLine and Mini-Steam)

Note: For initial operation, control, service, malfunctions, and circuit diagrams, consult the operation instructions for the Hygro-Matik-controls.

8. Commissioning

Attention: This unit should only be serviced by qualified personnel.

Switch off steam humidifier

Attention: Before the unit is switched on first be sure of how to switch it off.

» Switch off unit by switching control switch to postion 0.

» Close the water feed shut-off valve.

Switch on Steam Humidifier

» Check that all cable fittings, heater cables and connections are firmly grounded.

» Check seating of cylinder and clamps of steam and condensate hose.

» insert main fuses.

» switch on the control switch.

Make sure only fully demineralised water enters the cylinder.

» Operating pressure 0.2 to 10 bar.

» Set hygrostat of proportional controller to humidity required.

The following functions are taking place:

- The unit runs a selftest. If the control is equipped with a display, the message „selftest“ is displayed.
- When an external controller calls for himidity, the waterinlet solenoid valve opens andfeeds the steam cylinder with water.
- After approximately 15 to 20 minutes the steam production starts.

Once the solenoid valve start replenishing the water periodically the steam humidifier operates at constant rated output and the cold start sequence is complete.

» Observe the steam humidifier after 15 to 30 minutes of operation and check for any leaks.

Attention: Observe safety regulations governing work carried out with live components!

» Switch the unit off and stop the leaking.

9. Maintenance

The HygroMatik steam humidifier is easy to maintain. However, inadequate or improper maintenance can lead to operational malfunctions. Perform regular maintenance to give your unit a long life span.

Warning: When performing maintenance work, please note:

- The unit is only to be serviced by qualified, authorized personnel.
- Observe safety notes.
- Switch off the unit before maintenance and protect against restart.
- After maintenance work, have qualified personnel check that the unit is operating safely.

The steam humidifier's performance and maintenance intervals primarily depend on the water quality (carbonate hardness, conductivity) and the quantity of steam produced since the last maintenance. Abnormal water quality can shorten or lengthen maintenance intervals. Ongoing maintenance intervals can be estimated based on the amount and type of residue found in the steam cylinder.

Indications that cylinder maintenance is required immediately include:

Control	Indicator
Basic	maintenance message: **red LED** is blinking: Unit has switched itself off automatically.
Comfort Comfort Plus	**Maintenance** message on the display (red LED is blinking). Unit has switched itself off automatically*. The maintenance message can also be sent by one of the open programmable potentialfree contacts See EMP-Control Operation, Section "Parameter Settings with Codes"

* Also see corresponding control operation instruction, Section "Malfunctions".

9.1 Maintenance Work

Mineral deposits precipitate and crystallize very differently in different types of water, even when two types have the same conductivity and hardness levels (the various constituents in the water interact differently).

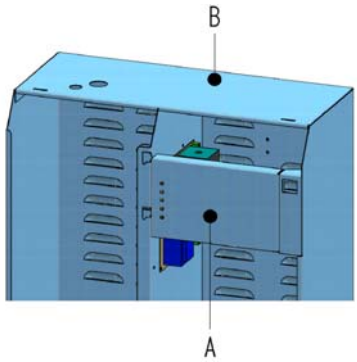
Instructions on maintenance and cleaning intervals, or on electrode service life, are based entirely on empirical data

Cycle	Maintenance Work
4 Weeks after initial operation (with normal water quality)	Visual inspection of electrical and mechanical connections Remove mineral deposits from steam cylinder, water drain hose and blow-down pump Check electrodes for erosion
Semiannually (with normal water quality and "normal" operation = 8h/Day)	Visual inspection of electrical and mechanical connections Remove mineral deposits from steam cylinder, water drain hose and blow-down pump und ggf. erneuern.Check electrodes for erosion

In most cases, the conductivity levels given in Section 1.1 "Directions for Use" of these instructions can be considered normal. Individual parameter setting of the control may be necessary.

In extreme cases, water pretreatment may be necessary (softening by dilution to approx. 4 - 8 °dH; decarbonization/partial desalination to achieve target reductions in carbonate hardness).

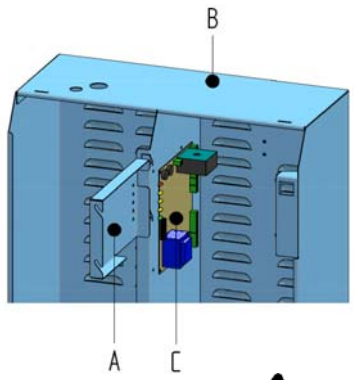
HygroMatik would be pleased to refer you to companies specializing in water treatment systems.



9.2 Access Electrical Enclosure

» Remove cover from humidifier (B) and lift display plate (A) of guiding.

» Turn display plate (please see sketch) and hang up display plate by using the „front guiding“.



» The basic PCB (C) is now accessable.

Danger, Hazardous Voltage: Make sure the unit is switched off before installing or removing the display plate.

9.3 Removing and Cleaning the Steam Cylinder

Warning: Please follow the detailed instructions in these operating instructions! The unit is only to be serviced by qualified, authorized personnel. Note the warnings and safety notes in the operating instructions. Failure to observe warnings and safety notes may result in injury, serious injury or death, and/or damage to the unit. The steam cylinder may still be hot when you begin maintenance work. Handle carefully!

Disassembly

» Switch on the unit by the main switch. The humidifier runs the pump for a few seconds. The purpose of this is to check that the system is operating properly.

» Drain residual water in the cylinder.

» Units with Basic, Comfort or Comfort Plus control electronics:

» Press the on/off control swith in position „II“.

» Units with Comfort or Comfort Plus control electronics:

» Press the Softwarekeys and simultaneously longer than 5 seconds.

» Open and remove cover.

» Disconnect the steam generator from the power supply. Control switch OFF and remove safety fuse F1.

» Check that unit is without power.

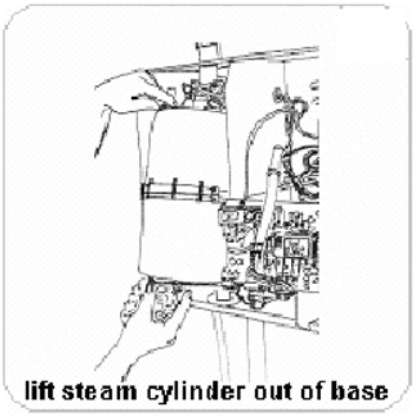
» Unscrew and remove the steam nozzle (1).

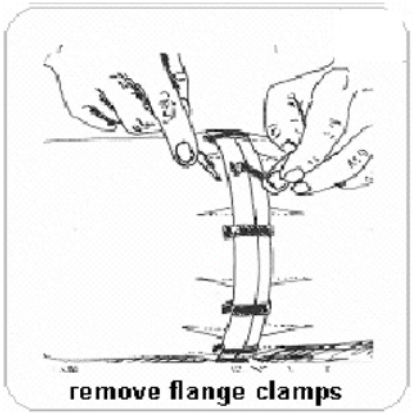
» Unplug the electrodes (4).

» Unplug the sensor electrode (10).

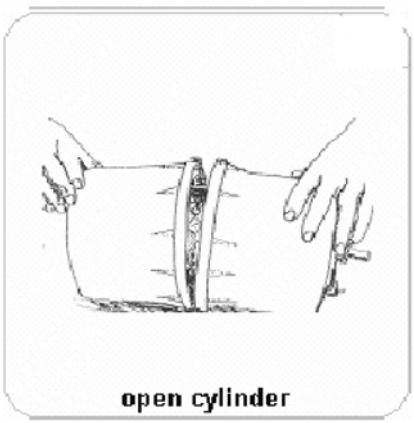
» Remove adapter (2) between steam cylinder and steam nozzle (1).

» then:





Cleaning

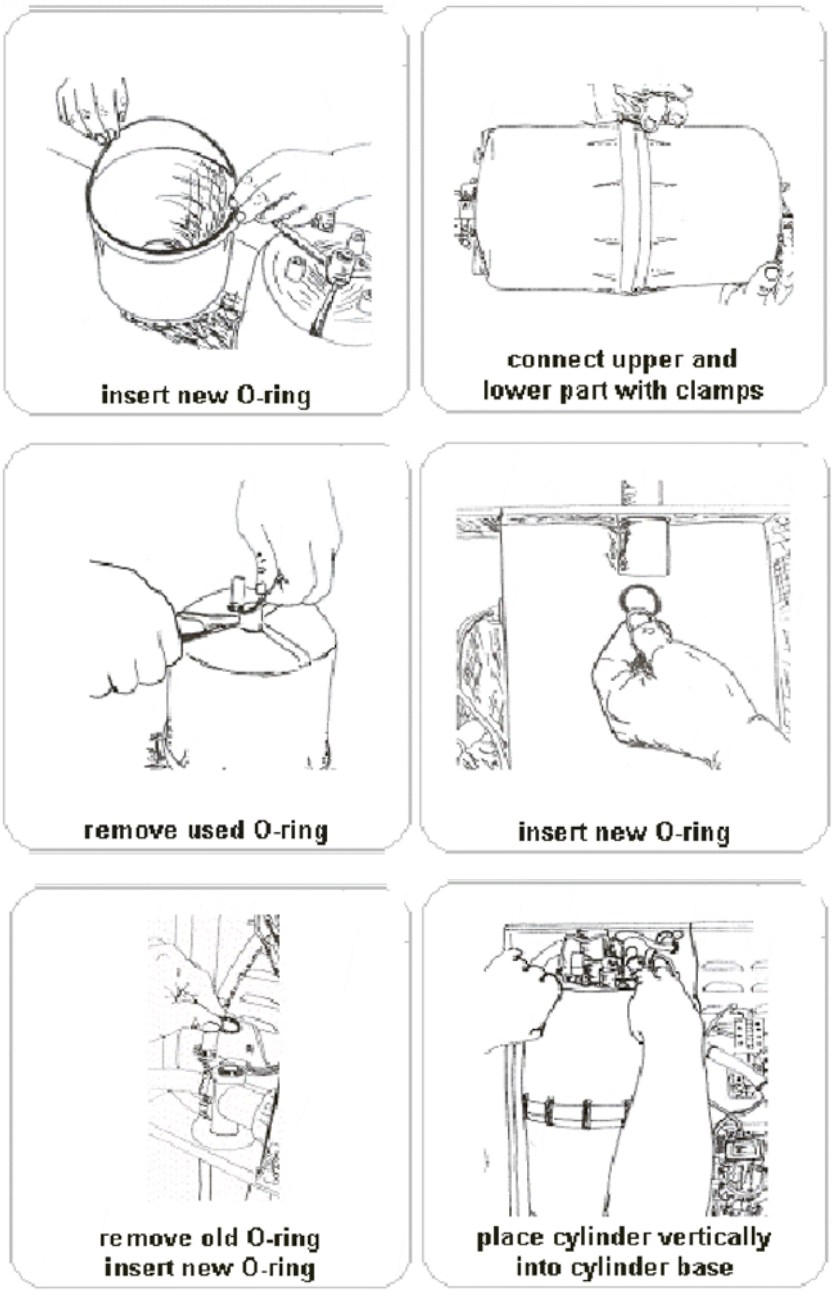


Warning: Check the inside of the top part of steam cylinder for crust build-up and possible salt bridges (black grooves between the electrode leads). If present, wash away completely .

Note: If electrical arcs have burned deep grooves in the material, the top part of the cylinder must be replaced.

Warning: Clean the sensor electrode until it is bright.

Reassembly



» Connect plug (10) to level sensor.

» Connect plugs (4) to electrodes.

Warning: The plug must be pressed down onto the electrode as far as it will go.

Note: Connect plugs to the correct electrodes. Note the color of the knurled nut.

Note: Condensate connection must be showing in the front on the left.

» Push in safety fuses.

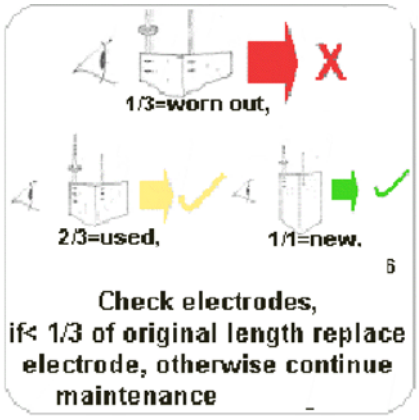
Switch on the unit and check for leaks after 15-30 minutes of operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

9.4 Electrode wear

Electrode wear depends on:

- feed water composition and conductivity.
- the quantity of steam produced.



Warning: At the latest, electrodes must be replaced if a maintenance message is displayed. The maintenance message appears after one hour of operation at maximum water level. The humidifier switches itself off. Also see Section "Maintenance." When the electrodes are less than 1/3 to 1/2 of their original length, replace them.

9.4.1 Original Electrode Lengths

Original lengths of HygroMatik large area stainless-steel electrodes are:

HyLine:

Type	HY05-HY08	HY13-HY60	HY90-HY116
Length [mm]	155	235	300

CompactLine:

Type	C6	C10	C17-45	C58
Length [mm]	125	155	235	300

MiniSteam:

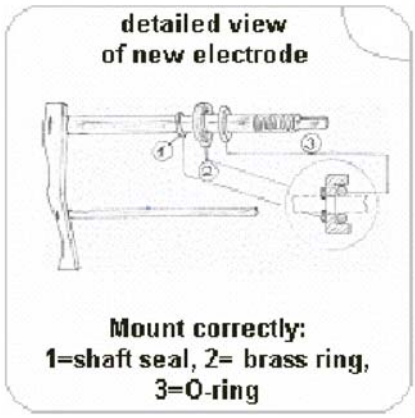
Type	MS5	MS10
Length [mm]	125	155

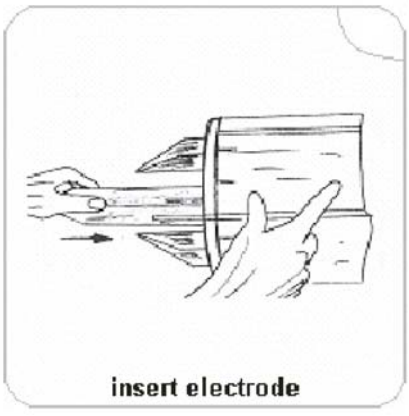
9.4.2 Uneven Electrode Lengths

In most case, the longer electrode(s) will not be supplied with electricity for a time. Therefore they will not wear. The cause of the problem, such as a tripped circuit breaker, can be repaired. However, since the shorter electrode(s) have a greater specific load, the electrodes continue to wear unevenly.

Note: Replace electrodes with significantly uneven wear. Check the power supply (breaker, voltage drop). Also see electronic operation, Section "Malfunctions."

9.5 Replacing Electrodes





» Remove cylinder, as described in Chapter 8.3 "Removing and Cleaning Steam Cylinder."

» Loosen knurled nuts (5) and remove electrodes (48).

» Install new electrodes and hand tighten the nuts.

» Use solvent-free, HygroMatik-quality o-rings (for flange, cylinder base and steam hose adapter).

» assemble steam cylinder and place it into housing.

» Connect plugs (4) directly to the electrodes (48) (with gray, red and black knurled nuts). It is not necessary to detach the knurled nuts!

Warning: The plug must be pressed down onto the electrode as far as it will go.

Note: Connect plugs to the correct electrodes. Pay attention to the color of the knurled nut.

» Attach plug (8) to the sensor electrode. (Knurled nut (9) - gray)

» Switch breaker back on.

» Switch on the unit and check for leaks after 15-30 minutes of operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

Note: In the following cases:

- the electrodes must be frequently replaced,
- black slime collects inside the cylinder, or
- there is "lightning" in the cylinder,

the conductivity of the water is too high or it isn't decanted often enough. In this case please contact HygroMatik.

9.6 Cleaning the Blow- Down Pump

» Remove cylinder, as described in Section: "Removing and Cleaning the Steam Cylinder"

» Detach e-cable from the pump.

» Detach adapter (30) from the pump.

» Loosen screws (44) and remove the pump from the base.

» Open the pump (bayonet lock).

» Remove residues from the drain hoses and pump (potentially replace o-ring (33) or housing (34) if these components are no longer in excellent condition).

» Reassemble the pump.

» Moisten o-ring (31) and insert in the side connection of the base.

» Push pump into the base and mount tightly with screws (44).

» Moisten o-ring (31) and insert in adapter (30).

» Fit adapter (30) over the side connection of the pump.

» Connect e-cable to the pump.

» Install cylinder,

» Switch on the unit and check for leaks during operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

9.7 Cleaning the Water Inlet Solenoid Valve

Removal

» Shut off water supply and loosen water installation hose connection.

» Remove cylinder, as described in Section: "Removing and Cleaning the Steam Cylinder"

» Loosen connecting hose (21) from the base.

» Detach e-cable from the solenoid valve.

» Loosen solenoid valve mounting screws (28).

» Remove solenoid valve from the borehole.

» Remove fine mesh filter (29) from the solenoid valve, clean and replace if needed.

Installation

» Insert fine mesh filter (29).

» Place solenoid valve with seal in the borehole of the unit housing.

» Attach solenoid valve tightly with screws (28).

» Screw on water installation hose.

» Connect e-cable to the solenoid valve.

» Attach connecting hose (21) to the base.

» Install cylinder, as described in Section: "Removing and Cleaning the Steam Cylinder"

» Turn on the tap.

» Switch on the unit and check for leaks during operation.

If leakage occurs, switch off power supply and follow safety instructions for work on live components.

9.8 Checking Cable Connections and Electrode Cables

» Make sure that no cable and plug connections are loose.

Warning: Plugs must be pressed down onto electrodes as far as they will go.

Loose cable connections cause excessive contact resistance and overheating of contact surfaces.

» Check electrode plug isolation, replace plugs as needed.

Warning: Replace electrode plugs after removing and reinstalling them several times.

9.9 Checking Operation

Start up the unit and operate for a few minutes at maximum output if possible.

» Check safety devices.

» Check hose connections for possible leaks.

9.10 Dismantling

After you stop using the steam humidifier, dismantle (demolish or scrap) it by following the installation procedures in reverse order.

Warning: Dismantling of the unit is only to be attempted by qualified personnel. Electrical dismantling is only to be attempted by trained professionals.

Note the information provided in Section 2 "Safety Notes," especially the guidelines for disposal.

10. EC-Decleration of Conformity

EG-Konformitätserklärung
EC Declaration of Conformity

Hersteller: **Hygromatik LTA GmbH**
Manufacturer: *Hygromatik LTA GmbH*

Anschrift: Lise-Meitner-Straße 3
Address: *D-24558 Henstedt-Ulzburg / Germany*

Produktbezeichnung / ***Product description:***
Hy-Line: HY05, HY08, HY13, HY17, HY23, HY30, HY45, HY60, HY90, HY116
C-Line: C06, C10, C17, C30, C45, C58
MiniSteam: MS05, MS10

In den Ausführungen / *Type*: Basic, Comfort, Comfort Plus, Dampfbad / *Steam bath* (DS)

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:
The products described above in the form as delivered are in conformity with the provisions of the following European Directives:

89/336/EWG Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit (geändert durch 92/31/EWG, 93/68/EWG und 93/97/EWG).

Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility (amended by 92/31/EEC, 93/68/EEC and 93/97/EEC).

73/23/EWG Richtlinie des Rates zur Anleitung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (geändert durch 93/68/EWG).

Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits (amended by 93/68/EEC).

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen:
Conformity to the Directives is assured through the application of the following standards:

Referenznummer: ***Reference number:***	**Ausgabedatum:** ***Edition:***	**Referenznummer:** ***Reference number:***	**Ausgabedatum:** ***Edition:***
DIN EN 55022 B	11 / 01	DIN EN 60335-1	07 / 03
DIN EN 61000-4-2	12 / 01	DIN EN 60335-2-98	05 / 04
DIN EN 61000-4-3	11 / 03	DIN EN 50366	11 / 03
EN 61000-4-4	IEC61000-4-4 :1995 + A1 : 2000+ A2 : 2001	DIN EN 60519-1 Geräte/*Units* ab/*from* 480 bis/*to* 690 V	08 / 95
EN 61000-4-5	IEC61000-4-5 :1995 + A1 :2000	DIN EN 60519-2 Geräte/*Units* ab/*from* 480 bis/*to* 690 V	03 / 95
EN 61000-4-6	IEC61000-4-6 :1996 + A1 :2000		

Die Anforderungen des Geräte- und Produktsicherheitsgesetzes GPSG) §4 Abs. 1 bis 3 werden eingehalten. *The requirements of the Appliance and Product Safety Law paragraph 4 clause 1 to 3 are met.*

Henstedt-Ulzburg, den / *the* 01.01.2005

Hygromatik LTA GmbH

Eberhard Langheld
General Manager

i.V.
Dirc Menssing
Technical Manager / Quality Manager

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

11. Spare Parts

*	MS5	MS10	Article no.	Description
			E-2124010	Keys for safety, set=2pc.
			E-2124012	Safety lock incl. 2 keys
				Steam generation
	1		B-3216067	Steam cylinder CY4 transp. compl. with electrodes and Hand nuts **
		1	B-3204031	Steam cylinder CY8 transp. compl. with electrodes and Hand nuts **
16		1	E-3216043	Top part of steam cylinder CY4 empty
16	1	1	E-3226005	Top part of steam cylinder CY8 empty
19	1		B-3216044	Lower part of steam cylinder compl. with strainer **
19		1	B-3216007	Lower part of steam cylinder compl. with strainer **
17	1	1	E-3216046	O-ring seal for cylinder flange, transparent cylinder
17			E-3216010	O-ring seal for cylinder flange, transparent cylinder
35	1	1	E-3216011	O-ring seal for cylinder base
	1		E-3216021	Condensate plug DN 9
		1	E-2204035	Condensate plug DN 12
48	1		B-3216061	Electrodes compl. without hand nuts, set=3pc.
48		1	B-3204019	Electrodes compl. with hand nuts, set=3pc.
10	1		B-3204037	Sensor electrode compl. with hand nut, max. limitation
10		1	B-3204027	Sensor electrode compl. with hand nut, max. limitation
4	1	1	E-3216024	Plug-in contact with insulating hose for electrodes
10	3	3	E-3216025	Plug-in contact with insulating hose for sensorelectrode
18	12	12	E-3216022	Clamp for flange of transparent cylinder
37	1	1	E-3220000	Cylinder base DN 20/25/15/12
	1		E-3117014	Fan 60x120 mm
		1	E-3117012	Fan 60x180 mm
1	1		E-3126048	Steam nozzle
1		1	E-3126130	Steam nozzle
2	1		E-3126054	Adapter between steam cylinder and steam nozzle
2		1	E-3720008	Adapter between steam cylinder and steam nozzle
	0,41m	0,84m	E-2604014	Condensate hose steam nozzle - cylinder base DN12, per m
	1		B-3216077	maintenance kit for cylinder CY 4
		1	B-3216079	maintenance kit for cylinder CY 8
		1	B-2304063	Super Flush -upgrade kit-
				Water feed
25	1		B-2304081	Solenoid valve, servo controlled, straight type, 0,2-10 bar, 1,2l/min
25		1	B-2304083	Solenoid valve, servo controlled, straight type, 0,2-10 bar, 2,5l/min
		1	B-2304021	Solenoid valve, long-life, servo controlled,straight, 0,1-10bar,2,5l/min
56	1	1	B-2304031	Hose for water connection, 3/4" cap nuts on both sides
				Water feed without filling cup
	1	1	E-3616010	Elbow 90°, DN 12/14 E-2604004 / 02
	1	1	E-2304080	Erdungshülse
21	0,71m	0,90m	E-2604002	Connecting hose, solenoid valve - reduction, per m
	0,05m	0,05m	E-2604004	Connecting hose, reduction - cylinder base, per m

*	MS5	MS10	Article no.	Description
				Water feed with filling cup
5	1	1	B-3320406	Filling cup compl. with cover
	1	1	E-2325054	Earth plate for filling cup
2	0,32m	0,41m	E-2604002	Connecting hose, solenoid valve - filling cup, per m
3	0,37m	0,47m	E-2604004	Connecting hose, filling cup - cylinder base, per m
28	1	1	E-3616010	Elbow 90°, DN 12/14 E-2604004 / 02
				Water drain
	0,3m	0,4m	E-2604002	Connecting hose filling cup - pump, per m
	1	1	E-3425002	Adapter pump - drain hose. connections DN25/13
31	1	1	E-3220005	O-ring seal for adapter - pump
31	1	1	E-3220005	O-ring seal for cylinder base - pump
32	1	1	B-2404027	Drain pump without mounting set
	0,36m	0,45m	E-2604004	Drain hose filling cup - drain
57	1	1	E-2420423	Drain hose, 1 1/4", per m
	1		B-3401015	Drain hose system (pos. 19,23,24,25,27)
		1	B-3401017	Drain hose system (pos. 19,23,24,25,27)
6	1	1	E-2425004	Elbow with vent pipe
				Control
				universal
	1	1	E-2501005	Main contactor 16 A, 230 V
	1	1	E-2505206	Control fuse 1,6 A, 5x20 mm
4	1	1	B-3526019	Connecting cables for electrodes with plug-in contact, set=3pc
	1	1	B-2525051	Connecting cable for sensor electrode with plug-in contact, 630 mm
	x	x	E-0611001	Room hygrostat HG-Mini
				Basic Control
	1	1	B-2526201	Basic mainboard
	1	1	E-2502412	control switch, 2 pole
52	1	1	B-2120901	Mountinig plate (Basic)
				Comfort Control
	1	1	B-2526201	Basic mainboard
	1	1	E-2502412	control switch, 2 pole
52	1	1	B-2120903	Mounting plate (Comfort)
	1	1	B-2526401	Display (Comfort)

If you order any spare parts, please specify type and serial number of the unit.

* Exploded view

** If the Super Flush System is installed, consider to order also a new nozzle (B-2304079), please.

*** Maintenance set consists of: electrodes (without hand nuts), o-ring for steam hose adapter, o-ring for cylinder flange, o-ring for cylinder base

12. Fax Form - Order for spare parts

HYGROMATIK
We humidify the air.

Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg
Tel. +4904193/895-0

Fax Form

Please copy, fill in and fax to

Fax.No. **+49(0)4193/895-33**

Order of spare parts

unit type *_____ serial no.* _____

commission: _____ order no.: _____

quantity	article	article no.

date of delivery _____forwarder _____ shipment by _____

delivery address (if different
from invoice address)

_____
_____
_____
_____

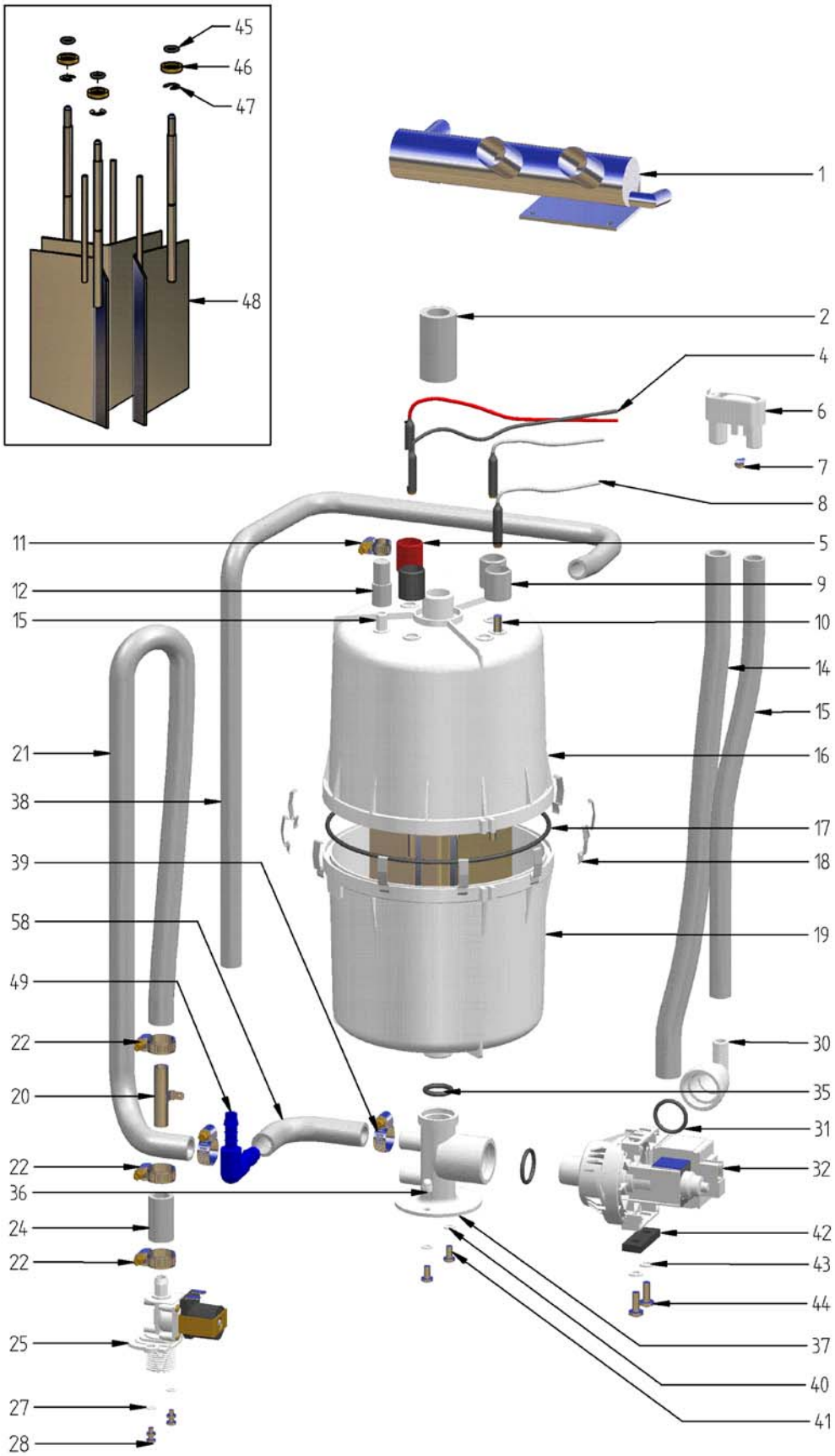
company stamp (delivery adress)
date/signature

* Order can only be processed if unit type and unit serial no. are filled in.

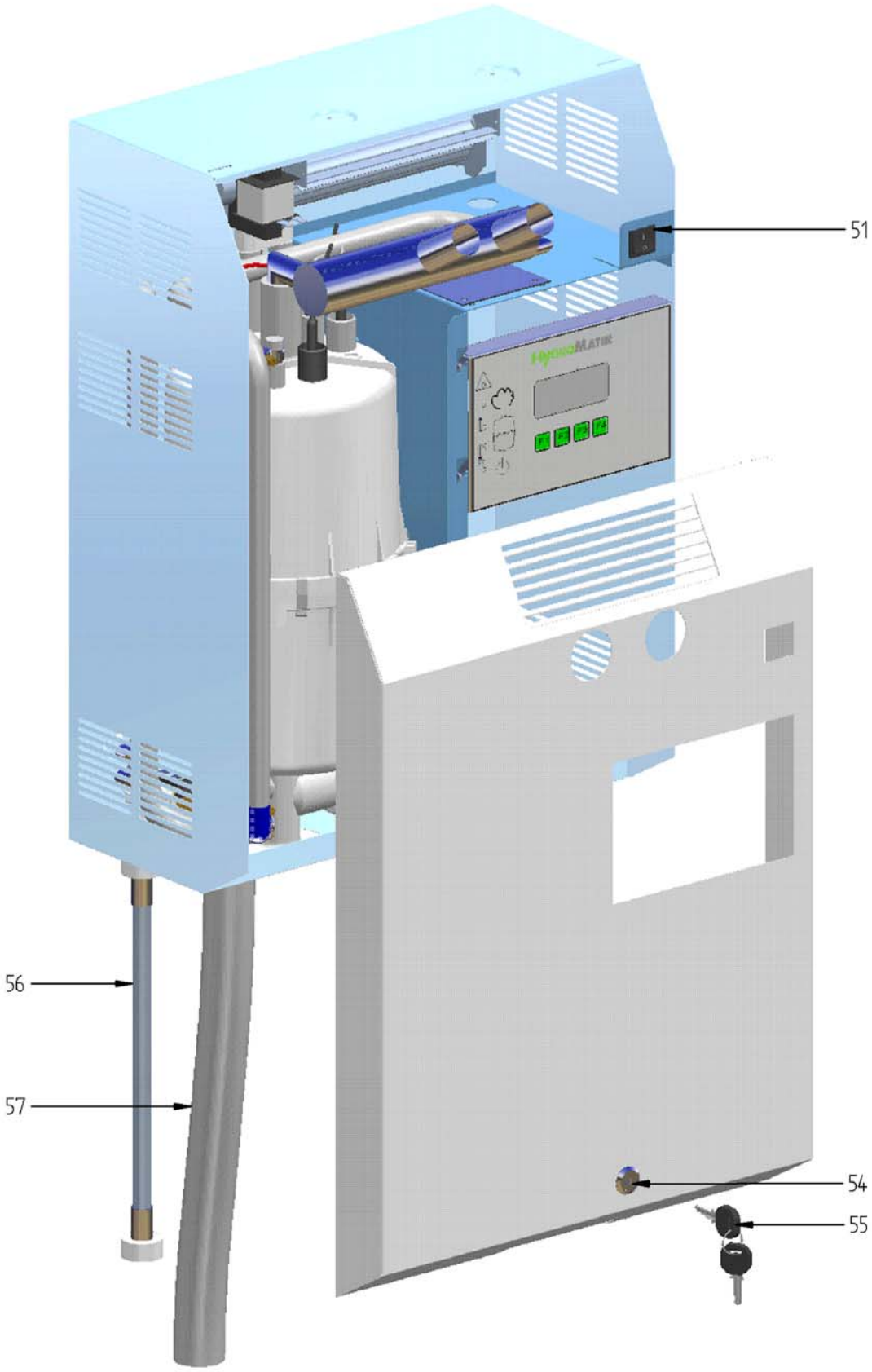
13. Technical Data

Technical Data Steam Humidifiers MiniSteam			
Type	MS5	MS5	MS10
Steam Output [kg/h]	4,8	5	10
Electrical Supply	230V/1/N/50-60Hz	400V/3/N/50-60Hz	
Electrical Power [kW]	3,6	3,8	7,5
Current [A]	15,7	5,4	10,8
Fuse [A]	1 x 16 *	3 x 6 *	3x 16 *
Control Type	Basic, Comfort		
Control Voltage	230V/50-60Hz		
Empty Weight [kg]	11	11	13
Operation Weight [kg]	14	14	19
Dimensions Height [mm]	471		561
Width [mm]	373		407
Depth [mm]	178		208
Water Supply	1 to 10 bar incl. connection ¾"		
Water Drain	into funnel		
Air Circulation [m³/h]	66		165
* Times 1.3 power input after Full Blow Down. If explusion fuses are used close to their specific limit we recommend to chosse explusion fuses with a higher range.			

14. Exploded View



15. View of housing



HYGROMATIK
Lise-Meitner.Str.3 • D-24558 Henstedt-Ulzburg
Phone +49(0)4193/ 895-0 • Fax -33
eMail hy@hygromatik.de • www.hygromatik.com
A member of the spirax sarco Group